

# A GUIDE

TO

# PAINTING ON GLASS.

BY

H. BIELFELD.

LONDON:

GEORGE ROWNEY & CO., 51, RATHBONE PLACE.

—  
1855.

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## INTRODUCTION.

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THE demands for Paintings on Glass within the last ten or twelve years have increased to a very considerable extent, on account of the many improvements which have been made in this department of Art, as well as in the Optical Instruments at present in use for exhibiting them. Instead of being now used merely for the amusement of children, as the Magic Lantern was, it is now found to be a very important auxiliary to Lecturers, for conveying most useful instruction, not only to the young, but to all classes of society.

It is my intention in this little work to endeavour to give such instructions to Students, Amateurs, and Lecturers, who may have a knowledge of the rudiments of Drawing, as will enable them to execute their own designs without the aid of a master.

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## WATER-COLOUR PAINTING ON GLASS.

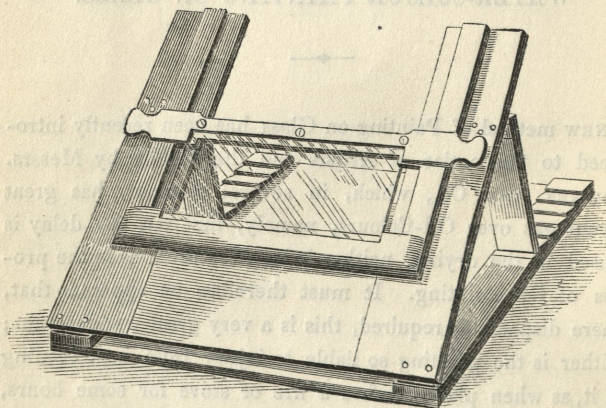
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A NEW method of Painting on Glass has been recently introduced to the notice of Artists and the Public by Messrs. ROWNEY AND Co., which, in several respects, has great advantages over Oil-Colours, namely, that not any delay is caused in the drying, neither is heat required, as in the process of Oil Painting. It must therefore be apparent that, where dispatch is required, this is a very great desideratum ; neither is the painting so liable to injury from dust settling on it, as when placed before a fire or stove for some hours, which is almost unavoidable in the Oil process, whatever precautions may be taken to prevent it. Nor is there any more delay or difficulty caused by the Colours not drying as well in Winter, or cold weather, as in Summer.

Another advantage is that, should it be necessary to retouch the painting frequently, it is not so liable to become heavy and coarse as will frequently happen in using Oil-Colours, which is very detrimental to the painting when seen magnified on the disc.



The first article requisite on commencing to paint on glass, is a frame-work of wood, or a desk, on which to rest the glass—placing it towards the light in an oblique position, so that the light shines against the under part of the glass. A piece of white paper laid beneath, in a horizontal position, will enable the person at work to see the most delicate tint or touch made on the glass.



Having selected a perfect piece of glass the size required, quite free from the smallest specks or bubbles, which are constantly to be found both in Plate and Crown Glass, clean it very carefully, taking care that no grease or finger-marks remain, especially if painting in Water-Colours; and it would be advisable before commencing the outline, to pass a weak solution of gall water over the surface, and wipe it dry with a clean piece of linen.

## OUTLINES OF THE PAINTING.

The glass being cleaned, as before mentioned, make a correct outline of the subject you intend to paint on paper, then carefully lay the glass on it. Take a very fine pointed sable, or camels' hair brush, dipped in Indian ink—a small quantity of gall being dissolved in the water used to moisten it—until you are able to make a fine line on the glass. Commence tracing, and endeavour to keep the lines as fine and equal as possible. This will require a little practice and care.

## NEW METHOD OF OUTLINING.

Having cleaned the glass as above directed, take a piece of clean linen, moistened with spirits of turpentine—rub it well all over the side of the glass on which you intend to make the outline—then wipe it dry. Instead of the fine-pointed brush, which I have stated requires some practice and care, to keep the lines equal, fine, and distinct, Messrs. ROWNEY & Co. have substituted a Chalk, by which outlines can be traced on the glass, and which does not require any fixing to prevent its being rubbed out or obliterated when laying on the colours. The inexperienced painter will find this chalk preferable to using the point of a brush in obtaining the outline; for owing to the difficulty of ascertaining when the brush touches the glass, the line is apt to become thick and unequal, and prove a great obstacle to the delicacy and fineness of the paint-



ing in the finishing; for every layer of colour over the outlines tends to increase the thickness of them. Therefore, the finer and sharper the outline, the better will the painting appear. If any mistake in the outlines occur, or should it be found necessary to take out any part of it, it may be done with a piece of linen, or a stiff brush, moistened with spirits of turpentine, carefully rubbed over the part till quite obliterated. It will be necessary to keep a fine point to the chalk, if a delicate line is required.

Having obtained a satisfactory outline, the first layer of colours may now be laid on.

*List of Colours used in Water-Colour Painting on  
Glass, &c.*

The Colours requisite for Painting in Water-Colours on Glass are the the following; and I have here given the names in the order they may placed on the palette or slab:—

Yellow,	Intense Brown,
Scarlet,	Light Green,
Crimson,	Dark Green,
Burnt Sienna,	Opaque Black,
Warm Brown,	Light Blue.

Spirits of Turpentine.

Prepared Chalk for Outlines.

Varnish for Glass Painting in Water-Colours to be used after each stage of the painting or retouching, for fixing the colours.



*Directions for Mixing Colours to obtain various Tints.*

## YELLOW.

As various tints of Yellow are required in every picture, especially landscapes, it will be necessary to mix other colours with it, to increase its richness, depth, and variety of tint; also to produce other colours not mentioned in the above list, which may be considered only as primitive, with the exception of the Greens. I will commence with

## ORANGE.

Orange is made by adding a little Scarlet with the Yellow. This will make a bright Orange, or warm Yellow. Another tint of warm Yellow may be made by mixing a little of the Burnt Sienna with the Yellow. Every requisite variety may be obtained by mixing these colours, and adding more or less of the Scarlet or Burnt Sienna with the Yellow.

## CRIMSON.

Crimson may be made to approach nearer Scarlet, by adding a small quantity of the Yellow.

## PURPLE.

Purple is obtained by mixing Crimson with the Light Blue, various tints of which, from the Red to the Blue, or Royal Purple, are produced by adding a greater or less quantity of Blue.

## BROWNS.

Various tints of Brown may be made by mixing the two Browns named in the List of Colours; also, by adding

Yellow and Burnt Sienna with them, according to the warmth or depth of tint required.

#### GREENS.

The Greens may also be greatly varied by mixing the two together in different proportions. Lighter and warmer Greens, by adding some of the Yellow with them.

#### OPAQUE BLACK.

The Opaque Black is only to be used to stop out those parts of the painting where no light is intended to pass through: for instance, in designs where objects or figures have a decidedly black back ground, such as Astronomical Diagrams, Chromatropes, Magic Lantern Slides, strengthening the ropes of Vessels, or any very dark, sharp, and black lines in a picture.

### THE FIRST LAYER OF COLOURS.

What is most requisite in this stage of the painting is clearness and evenness of the tints, and, as the Water-Colours on glass dry as quickly as on card or paper, it will require some little practice and care to keep the colours of an equal tint, neither too dark or light, but it is better to keep them light than dark. Now as glass does not absorb colour, but merely retains it on its surface, it will require different management to that ordinarily used when painting on paper or card-board, and it will frequently happen, before you can obtain the required equality of tint, that the paint will have become too dry, and that by moistening the brush in water,



or adding more colour, in order to deepen parts or soften those which are too dark, as you would in Water-Colour painting, you will, on glass, take up the colour which has become nearly dry, and, consequently, have to lay the tint over again. In order to prevent this, should the paint dry on the glass before you can get the equal tint required, breathe on it till you find it becomes moist enough to smooth and blend all inequalities, by going over it lightly with a clean flat camels' hair brush; you will then be able to work the colour quite smooth and equal, and to the required tint. This first colouring requires the most care, and is more difficult to work than the subsequent tints, for the reason stated above, that the glass is not absorbent, and, also, on account of its being a polished surface. When you have satisfactorily laid on the first layer of colours, commencing with the sky and proceeding downwards to the foreground, on ascertaining that the colours are quite dry, take a sable or flat hogs' hair brush, and lay over all you have painted with a thin coat of the varnish prepared for the Water-Colours—the smoother and thinner the better. This will fix the first painting on the glass, and when dry, which it will be in a quarter of an hour, you may proceed with the second stage of the painting.

## SECOND PAINTING IN WATER-COLOURS.

If you have succeeded in laying in the first painting smoothly and equally, you will have very little difficulty, either in this or the subsequent stages of the picture, in work-



ing up and strengthening the tints; for you have now obtained a groundwork for each succeeding layer of colour. In this second painting, you proceed to lay in the clouds; and, if a Sunset, use the Pale Yellow and Scarlet at the horizon, carefully softening the tint as you proceed towards the zenith, or top of the picture, until the warm tint imperceptibly blends with the Blue. Should the colours dry before you have sufficiently blended them, breathe on the glass, and proceed, as before-mentioned, in the first painting. Then commence strengthening and defining the distant hills or objects in the painting, carefully avoid getting them too dark or heavy, as you can easily strengthen them at any time. Having thus made out the forms, and laid in the shadows of the distant hills, or other objects, proceed with the middle distance in the same manner, gradually making your tints stronger and warmer as you approach the foreground, where the most definition and strength is required, until you have laid in all that is requisite, and worked up the painting, as far as this second layer of colours will admit—taking care not to go over the same part with colour twice. When this second painting is dry, varnish again as before described; this will then prepare the painting for the third layer of colours.

### THIRD PAINTING.

The subject is now in a fit state to proceed with the finishing; on ascertaining that the last coat of varnish is dry, by carefully going over the parts which require strengthening

and defining, mark out each object in the picture with precision and distinctness, according to their relative distances, tinting and strengthening gradually to the foreground of the picture. Any positive lights may now be taken out with the scraper or point. The point is made by inserting a large needle into the end of a piece of wood, or handle of a painting brush. Should the picture require more finish or re-touching, it may be done as often as required—varnishing after each layer of colour—the thinner the coat of varnish the better, taking care that all the tints and colours last laid on are covered with varnish, for if not, it will work up with the brush passing over it.

Whether the pictures are painted in Water or Oil-Colours, it is always advisable to glaze them when finished, to preserve them from injury.



## GLASS PAINTING IN OIL-COLOURS.

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I SHALL now proceed to give a description of the process of Oil Painting on Glass.

The same kind of desk or frame-work is required, on which to place your glass, as in the Water-Colour Painting described in the commencement of this work. Neither will there be any necessity again to allude to the methods of Outlining, as they are equally applicable to Oil Painting. I will, therefore, commence with the first stage of the painting.

Having carefully looked over the outline, and on finding it correct, place the glass on the frame, and commence laying in the sky, which may be done in the following manner:—take some Blue from a tube, as prepared by Messrs. ROWNEY & Co., which will be sufficiently moist for the present purpose, without any addition either of oil or varnish; it may be laid on with a hog's-hair brush at first, using the brush as a dabber, making the colour deepest at the zenith, and gradually becoming fainter towards the horizon; the distant hills may be laid in at the same time.



When all the parts of the painting requiring a Blue tint are laid in, in order to obtain a beautiful equal tint, a dabber made of a piece of white kid stuffed with a little wool will be found useful, going carefully over the whole of the tint. After which, a large flat camel's-hair brush passed over the whole with care will produce a perfectly equal tint. A dabber is not always required, for the finger, when skilfully used, will prove an equally perfect one.

The White parts in the clouds may now be taken out with greater advantage than when the tint is quite dry, as they may be either made quite sharp, or softened off gradually. The lights may be taken out with a piece of leather or paper rolled up in the form of a stump.

Proceeding with the painting, sable brushes are now to be used ; and it will be as well here to give a list of the principal colours required.

Italian Pink,	Burnt Sienna,
Gamboge,	Burnt Umber,
Lakes,	Black,
Raw Sienna,	Chinese Blue.

And I would here mention the oils and varnishes best adapted for Oil Painting on Glass.

Pale Drying Oil,	Mastic Varnish,
Gold Size,	Spirits of Turpentine.

Copal Varnish is also frequently used.

Having set your slab or palette with the requisite colours from the tubes in the following order—Italian Pink, or Gamboge, Madder Lake, Crimson Lake, Burnt Sienna, Burnt Umber, Black, and Blue—put a small quantity of Drying Oil

and nearly half the quantity of Mastic Varnish in a gallipot, mix it well; use this occasionally to moisten the colours to the consistency required. If you desire the paint to dry quicker, add a small quantity of Gold Size with the Oil, or Copal Varnish. By using a greater or less quantity of the varnishes or gold size, the paint will dry quicker or slower. A small quantity of Turpentine is occasionally used in painting, as well as for cleaning the brushes.

The sky being laid in, the distant landscape or objects in the picture are next to be attended to with their appropriate colours, using a sable brush, and laying on the tints as cleanly and smoothly as possible, taking care not to make them too dark; for, it must be remembered, the tints can easily be made darker, but not lighter, in finishing the painting.

The foreground with its objects must now receive the first layer of colours, proceeding carefully as before, the tints being rather stronger, and the objects well and clearly defined; and I would here remark, for the instruction of those not well acquainted with making tints, that every requisite variety of Green can be made by mixing the Italian Pink, Gamboge, Raw Sienna, or Burnt Sienna, with the Blue;—using Italian Pink or Gamboge with Blue for the brightest Greens; the Siennas for the more subdued.

In order to obtain a tint the nearest to a Scarlet—Vermillion being an opaque colour, and therefore not available in Glass Painting—it is necessary to combine colours as a substitute for it; and it will be found that a very near approach to Scarlet may be obtained by a mixture of Gamboge or Italian Pink with Madder Lake; the latter being a delicate colour



not possessing much body, it will require two or three times going over to get the required depth ; and a little Burnt Sienna, for the shadows in finishing, will increase the depth and brilliancy. The Madders, Lakes, and Italian Pink, not drying so quickly as the other colours, will require a little Mastic Varnish to be mixed with them.

To facilitate the drying of the colours, which in winter or cold frosty weather will require several days if not submitted to heat, it will be necessary to place the glass, after each painting, before a fire or stove, on a stand, the side of the glass not painted being placed towards the fire, the glass resting on a stand, or against a board ; in a slanting direction, the top edge of the glass leaning against the upright part of the stand, the lower about an inch from it ; it will then stand firm, and also prevent dust from settling on the painting, which it is most essential to prevent—for, however well executed the painting may be, if dust settles on it whilst the colours are in a moist state, you will have the greatest difficulty (if it is not an impossibility) to get it off without destroying the painting. Two or three hours will generally suffice to dry the colours laid on the glass when exposed to a moderate heat ; and it is necessary to ascertain, before recommencing to paint, that the first layer of colours is dry, for if not, on working over it, it will disturb those beneath, and probably spoil the painting. A surgeon's lancet, or scraper, held in the hand as a razor, will be found very useful when the paint is quite dry, after each stage of the painting, to scrape off any little particles of grit or dust, which will occasionally adhere to the picture,



notwithstanding every precaution has been taken to prevent it. If they are not removed, they will increase in size, and become more visible after each layer of fresh colour. It will be seen, then, how very essential it is to prevent as much as possible any dust from settling on the picture. And I would here mention that pieces of linen, not cotton, should be used for wiping the brushes, as the flue from the cotton will adhere to the brushes, get mixed with the moist colours, and prove detrimental to the painting, like dust; for it must be remembered, when the picture is shown on the screen and magnified so many times larger, these little particles—being increased in equal proportion—become very visible, and give a coarse, disagreeable effect to the painting.

Having, then, cleared the picture from dust, we come to the Second Painting.

Now lay in the clouds with a sable brush; and should it be a sunset, requiring glowing tints, strengthen them with Yellows and Reds. From the sky, proceed with the shadows of the distant hills, putting in the Grey tints with a mixture of Lake and Blue, as the strength of the shadows may require; make out the different forms of the hills, trees, and objects with care: then strengthen the middle distance, blending the greys with warmer tints, strengthening and defining the different objects and forms, until you come to the foreground, which will require more strength of colour and definition.

Should there be any figures introduced, use the most brilliant colours for the draperies. A good flesh colour is obtained by a very slight tint of Burnt Sienna at first, worked

up when dry with a mixture of Madder Lake and Italian Pink. Avoid getting the painting heavy, as you can easily strengthen in the next and last touching.

Having completed the second stage of the painting, dry it as before described, then carefully remove any dust or grit with the brush and scraper. A feather from the wing of a fowl, or any large bird, will also be found useful for this purpose, and answers as well as a brush.

Some of the colours when dry, will frequently, in this stage of the painting, appear dull and opaque; a very slight coat of Mastic Varnish, the thinner the better, laid equally over the painting with a flat hog's-hair brush, will restore the transparency of the colours, and enable you to see what is wanting to complete the finish of the picture. This coat of varnish will dry in a few minutes, and you may proceed to the third and last process of finishing.

To lay down any particular rules in this stage of the painting would be useless, as regards tints, depth of colour, or minuteness of finish, for that must depend on the nature of the subject, whether a light or dark painting, glowing or cool colouring. Suffice it to say, that particular care and attention is now required in strengthening and finishing the different parts, relieving prominent objects by strengthening the shadows, and taking out the high lights, (which latter may be done with a penknife or scraper made for the purpose), by removing the paint from the surface of the glass. The lights thus taken out will be white, and, should they appear too light or harsh, may be easily subdued by a slight layer of colour laid over the parts cut out. For taking out fine lines, or



touches, a point will be found useful, which is made by inserting a needle into the end of a piece of wood or stick of a painting brush. The finest lights and lines may be easily taken out by this instrument, such as the ripple on water, lights on the edges of buildings, sharp lights in figures, &c., which produce the best effects. Having worked up the painting to the required finish, when dry, another slight coat of Mastic Varnish may be carefully laid over it. The painting may now be considered finished. If, in trying it on the disc, any parts require strengthening, or more high lights are wanting, they may be added by retouching as before.

In order to preserve the painting when quite finished, it will be necessary to place a piece of glass exactly the same size as the one on which the painting is ; over the painted side, and secure the two on the edges by a slip of paper pasted round it ; this prevents the paint from getting soiled, scratched, or otherwise injured, and the glass can be cleaned at any time, the same as a window.

A very necessary requisite in Glass Painting is to keep your brushes quite clean, which, if not strictly attended to, will cause much inconvenience, and probably spoil the painting. On leaving off painting for the day, dip the brushes in some Spirits of Turpentine, then press out the colour remaining in them with a piece of linen, afterwards wash the brushes thoroughly in yellow soap and water till you perceive they are quite clean, for, if they are permitted to dry with the Oil-Colour in them, it is probable the brush will be spoiled, or it will be very difficult to clean them thoroughly ; for some of the colour adhering to the roots of the brush, will occasionally



work out and mix with the fresh paint when used again, and appear as grit. Should you at any time be prevented from washing the brushes when you have left off painting, dip them in Olive Oil, and they will not be injured; but it will be necessary to wash them in soap and water, or dip them in Turpentine before using again, to cleanse them from the Olive Oil, as colours mixed with this oil will not dry.

It is not advisable to take more paint from the tubes than is wanted for one painting, as it will soon dry on the slab or palette, and become unfit for use. However, if at any time this should occur, place the slab under water, and the colours will keep moist there for a day or two.

## ASTRONOMICAL DIAGRAMMS.

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THESE Diagrams are of great utility in conveying instruction on this beautiful and interesting subject, Astronomy. The mechanical arrangements are supplied by Opticians, who generally have a great variety on sale, with paintings complete for exhibition. The mechanical parts may, however, be obtained separately, should the artist or amateur wish to paint them. These Diagrams principally consist of representations of the heavenly bodies revolving in their orbits, painted with black back-grounds. The glass is entirely painted over with the Opaque Black, so that not a ray of light can pass, excepting through those parts on which the objects are to be represented. They are, then, coloured with their appropriate tints, the same as in painting a landscape or any other subject. This subject is of great importance in training the mind to the study of this vast and magnificent portion of creation.

I will add a few more remarks in connection with it; and it may be as well to enter into a more minute description of the Diagrams and effects. Particular care and minuteness are required in delineating the different objects; the outlines must be fine and distinct, and relieve clearly on the background—no



uneven or ragged edges being permitted to remain either in the lines taken out with the point, on the dark back-ground, or around the different bodies depicted thereon. As much care and precision is required as when painting a figure or any delicate object in a view.

The principal subjects requiring mechanical arrangements and supplied by the opticians are the solar system, showing the revolution of the planets around the sun ; representations of the system of Ptolemy, Tycho Brahe, and Copernicus. Also eclipses ; theory of the tides ; comets moving in their orbits ; diurnal motion of the earth, causing day and night ; the seasons, with an allegorical representation of the zodiac, &c., &c., forming a most instructive and pleasing collection. The different Constellations of Stars may be added, but these do not require mechanical movements, and may be represented on a dark-blue sky, such as would be painted for a sky at night in a view.



## CHROMATROPES.

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THESE derive their name from the Greek, signifying many colours, and is a very ingenious and pleasing invention. They consist of two circular pieces of glass, inserted into flat brass rings or frames, grooved on the outer circumference to receive bands of string or gut, for the purpose of causing them to revolve: these are set in a framework of wood, to which is attached a wheel doubly grooved, to receive the two strings passing round the brass rings containing the glasses. By crossing one of the strings in the form of the letter X, and keeping the other straight, as over a windlass—passing them over the grooved rings and wheels—by turning the wheel, to which a handle is affixed, the glasses will rotate in contrary directions. Both of the glasses are to be painted with the same pattern and colours, representing stars, &c., such as boys strike with a pair of compasses in circles; and an infinite variety of such patterns or figures may be designed, suitable for Chromatropes. A great variety of colours may be introduced, keeping each colour as brilliant and positive as possible. Every part of the glass not occupied by the pattern, is painted over with Opaque Black, as in the Astronomical Diagrams.

The more brilliant and pure the colours are kept the better ; and the more exact the pair of patterns or designs are to each other, the more pleasing will be the effect produced. They are not so difficult to execute as paintings of Views, Interiors, Figures, &c., being a more mechanical process, and only require equality and brilliancy of tints, with exactness and neatness of execution in the delineation of the patterns.



## DOUBLE SLIDES.

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VARIOUS pleasing effects may be produced by double glasses, such as vessels sailing; the motion of a ship in a storm, tossed about on the waves; moving figures, windmills, and watermills at work, &c. These effects are obtained by painting the landscape or sea-view on one glass, and the objects which are intended to be made to move in them on another. For instance, a windmill at work—the view with the mill is painted on a circular piece of glass, and is fixed in a wood frame; the wings, which are intended to revolve, are painted on another glass, inserted in a flat ring of brass, with small teeth cut on the upper circumference of the ring; this is then placed on the first glass, in a circle cut out in the wood frame to receive them. A handle, with a pinion attached to the end of it, is also fixed in a groove to the wood frame work, the pinion being placed on the teeth of the brass ring—by turning the handle the wings revolve. It is scarcely requisite to add, that care is required to place the wings exactly in the place they ought to occupy on the mill, as if they were painted on one glass. The moving wheel of the water-mill is managed in the same manner.



There is another thing to be attended to—the exact centre of the glasses must be found, and the axis of the wheels marked on it, so that the wheel revolves on that point; otherwise, the wings or the wheel will appear to have two movements, rotating, and also revolving, around the mill, which will produce a most ridiculous effect. The motion of a ship on the water is obtained by painting the view on a glass fixed in a wood frame. The ship with moving water on the second glass, inserted in a flat circular brass framework, or ring, with a handle attached to it, resembling an eye-glass, and placed on the fixed view, as described in the painting of the windmill, then, by moving the handle to and fro gently, it will represent the ship's motion on the waves. Figures or objects which are intended to be made to move, or pass through the picture, are painted in the same manner, on a separate piece of glass, with this exception, that, instead of its being circular, it must be a long slip of glass, which is made to slide over the fixed painting in a groove cut in the wood frame. The mechanical frame-work for all these effects can be obtained from an Optician.

Various other effects may be produced; such as changing summer into winter, with snow falling—day and night, with lights in the windows, and lamps lighted—thunder storms—vessels struck with lightning, &c. All these are produced by placing the effects in the Lantern not having the view, both being used at the same time—one showing the subject, the other the effects. The best method to represent flashes of lightning, is to paint a glass entirely black, corresponding in size to the view in which you intend to show the storm.

Then mark out the lightning, on the spot from which you intend the flash to proceed, with white chalk on the black paint cleanly and carefully remove the paint with a point, so as to allow the rays of light freely to pass through the parts scraped or cut out. A piece of thin zinc or tin, attached to a spring wire, must cover the parts representing the flash—fasten a piece of string to this shade or cover—on pulling the string, it will draw the shade on one side, and the lightning appears; then, let go the string, and the covering instantaneously springs back and conceals it as before.

Rainbows may be shown—the bow painted on a black back ground. Also the Aurora Borealis, or Northern Lights, are painted and represented in the same manner. These produce a very pleasing effect when properly managed, by gradually admitting the rays of light from the Lantern in which the effect is placed to fall on the screen, whilst the view in the other Lantern is being represented. Then, by slowly closing the dissolver over the effect, the Rainbow will disappear, as in nature.



## MANAGEMENT OF THE LANTERN.

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As the object of this little work is principally intended to give instruction on Glass Painting, I am obliged to confine myself to a very limited description of the apparatus for exhibiting the paintings.

The first point in the management of the Lantern is, to obtain an uniform disc of light on the whitewashed wall, or a white linen or calico screen hung perpendicularly against it for the purpose. When you find your gas, or lamp, is giving a bright and steady light, shut the door of the Lantern and exclude every other light in the room. On looking to the disc of light produced on the screen, you will perhaps be disappointed at beholding its centre only lit up, and darkness radiating towards the circumference, or *vice versa*,—the centre dull, and illuminated parts towards the edge of the circle. These defects are, however, easily removed; both are occasioned merely by the want of adjustment of the focal distance between the light and the condensing lens, which may be obviated by placing the light nearer or farther off from the lens, until the proper focal position is attained, when the disc



of light will be uniform throughout. This uniformity is a matter of great importance, and must be obtained prior to placing the paintings intended to be shown in the Lantern.

There are also other imperfections which will frequently occur, namely—shadows appearing on the top, bottom, and sides of the illuminated disc; these are caused by the light not being exactly placed opposite the centre of the lens—either too high or low—which would occasion the shadow on the top or bottom of the disc, or too much to the right or left, which would cause the shadows on the sides.

Having obtained an equal and clear distribution of light on the disc, you may now place your painting in the Lantern. Having proceeded thus far, the next thing to be attended to is to obtain a clear and distinct representation of the painting on the screen, which is done by sliding the object lenses which are in front either farther from or nearer the painting, as the case may require; this must be done until you gain the required distinctness. It must also be remembered—in order to represent the whole of the picture distinctly—the back lenses or condensers must be rather larger than the dimensions of the painting.

## DISSOLVING VIEWS.

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Two Lanterns are required for Dissolving Views. The two must be placed side by side in an angular position—that is, their sides touching each other in front, but behind, a space left between them, wider or narrower, according to the distance your screen is from them, forming an angle more or less acute, so that the rays of light from both must cover the same space and occupy the same position on the screen, and appearing like one disc.

Suppose your first picture is being represented on the screen in what we shall denominate No. 1 Lantern, when you wish a change of subject or view, No. 2 is required, and the arrangements in this Lantern must exactly correspond with No. 1, the next view being placed in it ready for representation; but which must not be seen till the change takes place. In order to effect this, an apparatus, called a dissolver or fan, is fixed in front of the tubes of the Lantern where the rays of light issue, which can be raised or lowered at pleasure, so that when the picture in No. 1 is shown, No. 2 is closed, and *vice versa*—as one closes the other opens; and, by working this lever slowly, the picture in No. 1 gradually disappears, and the one in No. 2 takes its place on the screen.

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## DISSOLVING VIEWS

Two lanterns are required for Dissolving Views. The two must be placed side by side in an angular position—that is, their sides touching each other in front, but behind, a space left between them, wider or narrower, according to the distance your screen is from them, forming an angle more or less acute, so that the rays of light from both must cover the same space and occupy the same position on the screen, and appearing like one light.

Suppose your first picture is being represented on the screen in what we shall designate No. 1 lantern, when you wish a change of subject or view, No. 2 is required, and the arrangements in this lantern must exactly correspond with No. 1, the next view being placed in it ready for representation; but which must not be seen till the change takes place. In order to effect this, an apparatus, called a dissolver or fan, is fixed in front of the tubes of the lantern where the rays of light issue, which can be raised or lowered at pleasure, so that when the picture in No. 1 is shown, No. 2 is closed, and vice versa—as one closes the other opens; and, by working this lever slowly, the picture in No. 1 gradually disappears, and the one in No. 2 takes its place on the screen.